

REMARKS

Favorable reconsideration of this application, in light of the preceding amendments and following remarks, is respectfully requested.

Claims 1-18 are pending in this application. No claims are amended or cancelled. Claims 1 and 15 are the independent claims.

Applicants note with appreciation the Examiner's acknowledgement that certified copies of all priority documents have been received by the U.S.P.T.O. Action, summary at 12.

Applicants also respectfully note that the present action does not indicate that the drawings have been accepted by the Examiner. Applicants respectfully request that the Examiner's next communication include an indication as to the acceptability of the filed drawings or as to any perceived deficiencies so that the Applicants may have a full and fair opportunity to submit appropriate amendments and/or corrections to the drawings.

Furthermore, upon review of the enclosed Amendment, Applicants respectfully request that the Examiner contact the undersigned to discuss the Applicants' reasoning and/or possible claim amendments that may place the application in condition for allowance.

Specification Objections

The Specification stands objected to as allegedly introducing new matter into the disclosure under 35 U.S.C. §132(a). Applicants respectfully traverse this objection.

The process of either oxidizing or reducing the surface of the semiconductor nanocrystal does have support in original claims 5 and 15 and paragraph [0034]. Therefore, no new matter is being introduced to the specification. As such, Applicants submit that the Specification does provide support for the surface of the nanocrystal being oxidized or reduced.

Reconsideration and withdrawal of the rejection is kindly requested.

Rejections under 35 U.S.C. § 103

Claims 1-18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Dutta (US 6,906,339, previously cited) in view of Rockenberger et al. (US 6,878,184, previously cited). Applicants respectfully traverse this rejection for the reasons detailed below.

The outstanding Office Action on page 3, lines 12-13, acknowledges that Dutta fails to disclose “nanocrystals being coordinated by an organic dispersant” and relies on the teachings of Rockenberger for this feature of independent claim 1.

In addition to the above-identified deficiency of Dutta, it is the Applicants’ understanding that Dutta disclose semiconductor nanoparticles having elementally passivated surfaces which are obtained by the following steps: (1) forming II-VI, III-V and IV-VI nanoparticles by using compounds of Groups II, III and IV (e.g., PbO, ZnO and CdO) and ammonia compounds of Groups V and VI (e.g., (NH₄)₂S); (2) dispersing the nanoparticles in a water solution; and (3) adding the acid (e.g., HCl) to the solution which etches the nanoparticles to the desired size.

In the second step, the Cl of the etchants (HCl) reacts with atoms of the Groups II, III and IV that exist on the surface of the nanoparticles to produce chlorinated compounds (e.g., PbCl₂, ZnCl₂ and CdCl₂). As a result, an excess amount of S, Se or Te atoms (V and VI atoms) exist on the surface of the nanoparticles and the S, Se or Te atoms passivate the nanoparticles. That is, Dutta explains that some constituent components (e.g., Pb, Zn and/or Cd) of the nanoparticles are reduced and other constituent components (e.g., S, Se and/or Te) of the nanoparticles increase relatively, thereby the size of the nanoparticles can be controlled, the surfaces of the

nanoparticles can be passivated by the excess amount of the constituent components, and defects with the nanoparticle surfaces can be settled.

However, as described in col. 6, lines 44-45 of Dutta, H_2S is also produced when $PbCl_2$ is produced and H_2S can escape from the reaction system because it is a gas. Accordingly, Applicants respectfully submit that to state that the excess amount of S, Se or Te that may remain on the surface of the nanoparticles also passivates the surface of the nanoparticles is not persuasive. Even if S, Se or Te remained on the nanoparticles' surface, there is no basis for S, Se or Te becoming a passivating element capable of reducing surface defects of the nanoparticles.

On the other hand, in Rockenberger, reducing agents are used to reduce the molecular metal precursors (e.g., MO or ML). The reducing agents have the function of isolating O or L from the metal (M) to form semiconductor nanoparticles.

With respect to the proposed combination of Dutta and Rockenberger, Applicants respectfully submit that the combination is improper for at least the following reasons.

Dutta is directed to **treating the surface of** semiconductor nanoparticles, whereas the teachings of Rockenberger describe **forming** metal nanoparticles from metal precursors. Accordingly, Applicants respectfully submit there is insufficient evidence in the record for modifying the method of surface-treating semiconductor nanocrystals with a reducing agent of Dutta to incorporate the nanocrystals forming step of Rockenberger. Additionally, neither Dutta nor Rockenberger recognize the problems or solution thereto regarding the passivating element capable of reducing surface defects of the nanoparticles.

In addition, col. 3, lines 41-44 of Dutta explicitly describes that elemental passivated surfaces should be distinguished from formation of a semiconductor or organic surfactant shell

around a nanoparticle and organic compounds are not desirable in practicing the invention. Applicants respectfully submit that the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. See *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

Further, Applicants respectfully submit that an attempt to bring in the isolated teachings of the nanocrystals forming step of Rockenberger into the method for surface-treating semiconductor nanocrystals with a reducing agent of Dutta would amount to improperly picking and choosing from the different references without regard for the teachings of the references as a whole.¹

The Applicants maintain, therefore, that the Action does not present the required "convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references," *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985), and that this rejection may not be properly maintained absent such reasoning.

The Applicants, therefore, respectfully request that the rejection to Claims 1-18 under 35 U.S.C. § 103(a) be withdrawn.

Claims 2-14 and 16-18, dependent on independent claims 1 and 15, are patentable for the reasons stated above with respect to claims 1 and 15 as well as for their own merits.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection to independent claims 1 and 15 and all claims dependent thereon.

¹ See *In re Ehrreich* 590 F2d 902, 200 USPQ 504 (CCPA, 1979) (stating that patentability must be addressed "in terms of what would have been obvious to one of ordinary skill in the art at the time the invention was made in view of the sum of all the relevant teachings in the art, not in view of first one and then another of the isolated teachings in the art," and that one "must consider the entirety of the disclosure made by the references, and avoid combining them indiscriminately.")

CONCLUSION

In view of the above remarks and amendments, the Applicants respectfully submit that each of the pending objections and rejections has been addressed and overcome, placing the present application in condition for allowance. A notice to that effect is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to contact the undersigned.

As discussed above, Applicants respectfully request that the Examiner contact the undersigned to discuss the Applicants' reasoning and/or possible claim amendments that may place the application in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Erin G. Hoffman, Reg. No. 57,752, at the telephone number of the undersigned below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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By

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